

REMARKS

The present amendment is responsive to the Official Action mailed January 30, 2006. A petition for a three-month extension of the term for response to said Official Action, to and including July 30, 2006, is transmitted herewith. As July 30, 2006, is a Sunday, the present response is timely if filed on or before July 31, 2006.

Claims 9-13, 17-21, 24-32 and 35-45 were rejected under 35 U.S.C. § 102(e) as anticipated by *Wang et al.*, U.S. Patent No. 6,479,321 ("*Wang '321*").

By the present amendment, claim 9 has been modified to incorporate the feature formerly set forth in claim 11, which claim has now been canceled. Also, this feature has been rephrased to more clearly state that "at least some of the unoccupied top connections" of the bottom unit overlies at least one bottom unit chip. Merely by way of example, in the example shown in FIG. 3, unoccupied top connections 36 and 38 overlie the bottom unit chip 54 (chip 54 is numbered in FIGS. 1 and 4).

The structure shown in the drawings of *Wang '321* clearly does not include a "bottom unit" which includes "top connections facing upwardly away from said circuit board . . . at least some of said top connections being unoccupied and available to receive one or more additional microelectronic elements, at least some of the unoccupied top connections of said bottom unit overlying at least one said bottom unit chip." *Wang '321* teaches a conventional stack pack including a number of unit substrates 11. Each unit substrate 11 has I/O pads 13, 14, 15 (e.g., FIG. 1A) disposed in a peripheral region of the substrate, these pads and vias being exposed at both the upper surface 111 and lower surface 112 of the unit substrate. A chip (12, FIG. 1A; unnumbered in FIG. 8A) is mounted on the lower surface of the substrate in a central area of the substrate, remote from the pads and vias 13, 14, 15.

Assuming for purposes of argument that one could consider the unit substrate 11 of one unit in a stack (e.g., FIGS. 7 or 8A-9A) as a "circuit board" as the Examiner apparently regards it, and consider another unit as the "bottom unit" referred to in the claim, and further assuming that one could consider the pads and vias on one side of this unit as the mounting connections which attach the bottom unit to the circuit board and the pads and vias on the opposite side as the "top connections," and even assuming that some of these top connections remain unoccupied, the assembly still does not meet claim 9 as amended; none of the unoccupied top connections overlie the bottom unit chip. Stated another way, the pads and vias 13, 14, 15 cannot form unoccupied top connections overlying a bottom unit chip for the simple reason that these pads and vias do not overlie the chip at all. The rejection of claim 9 should be withdrawn. The rejections of dependent claims 10, 12, and 13 should be withdrawn for the same reasons.

Independent claim 17 was also rejected on *Wang* '321. Claim 17 has been amended to include the recitation of the "circuit panel" formerly set forth in claim 19, which has now been canceled. Also, this recitation has been clarified to state that the mounting masses "bond" the mounting pads of the bottom unit with the contact pads of the circuit panel.

As discussed above, *Wang* '321 teaches a conventional stack pack with units stacked one on top of the other, each such unit including a unit substrate 11. The Official Action appears to treat the unit substrate of the lower-most unit shown at the bottom of the drawing in FIG. 8 as constituting the "circuit panel," the unit shown in the middle of the drawing as the "bottom unit" referred to in the claim, and the unit shown at the top of the drawing (chip 12 and unit substrate 11) as the "packaged semiconductor chip" referred to in the claim. If *Wang* '321 could be construed in this way, the solder balls connecting

the middle unit in the drawing to the bottom unit would constitute the "mounting masses," whereas the solder balls connecting the middle unit to the top unit in the drawing would constitute the "top conductive bonding material." As so construed, the reference does not meet the last paragraph of claim 17, which recites that the top conductive bonding material has "lesser height than said mounting masses." The solder balls connecting the top unit in the drawing to the middle unit are identical to the solder balls connecting the middle unit to the bottom unit. Notably, the solder balls at the bottom of FIG. 8, in the stage of completion shown in FIG. 8, are not bonded to mounting pads of any other element, and accordingly, cannot constitute the "mounting masses" referred to in the claim. Assuming for purposes of argument that the assembly shown in FIG. 8 is later bonded to a larger circuit board, the bottom-most solder balls would be reflowed in exactly the same manner as the other solder balls on the other unit, and would have the same height. It is noted that, e.g., FIG. 2A of the reference shows a bare chip 12 bonded to a unit substrate. However, that bare chip itself does not constitute a "packaged semiconductor chip." Therefore, the height of any masses which might arguably connect chip 12 to unit substrate 11 is irrelevant in considering claim 17. Also, it is noted that FIG. 4C, which appears to show solder balls of different sizes, in fact shows the assembly prior to reflow, before the units are connected to one another and before any mounting pads bond to any circuit board as required by the claim. Thus, none of the drawings and none of the disclosure in *Wang* '321 is seen as teaching the structure of claim 17, in which the top conductive bonding material has "lesser height than said mounting masses." The rejection of claim 17 should be withdrawn, along with the rejections of claims 18, 20-22, and 24-27, dependent from claim 17.

The rejection of claim 28 on *Wang* '321 should be withdrawn for reasons similar to those advanced above in connection with claim 9. Thus, claim 28 recites a structure in which "the bottom unit" has a substrate, and that substrate has "a portion extending over said bottom unit's semiconductor chip" and has "upwardly facing top connection pads . . . at least some of said top connection pads being disposed in said portion of said substrate." Claim 28 further recites a bottom unit semiconductor chip which is "permanently connected to said substrate." As defined in the specification (§ 0033) the term "permanently connected" has a particular meaning; a permanently connected chip cannot be removed from the substrate to which it is mounted simply by melting or baking the bonding material which forms the electrical connections. The only structure in *Wang* '321 which arguably has a chip permanently connected to a substrate is shown in FIG. 8A, in which an overmold (not numbered) covers the chip. That structure does not include any "top connection pads" which are disposed in the portion of the substrate overlying the chip. As discussed above, the only arguable top connection pads are those formed by the vias and contact pads 13, 14, 15, and those pads lie in peripheral regions of the substrate, remote from the chip. The rejection of claim 28 should be withdrawn, along with the rejections of claims 29-32, 35, and 36.

By the present amendment, independent claim 37 has been modified to state explicitly that the first and second top microelectronic elements overlie different areas of the substrate. For example, in the embodiment of FIGS. 4 and 5 in the present drawings, the first and second packaged semiconductor chips 80 and 82 clearly overlie different areas of substrate 20. Of course, *Wang* '321 teaches a plurality of identical stacked units. Assuming that one could characterize the unit substrate 11 of one such unit as the "substrate"

referred to in the claim, each of the other units overlies the entirety of such substrate. In the alternative, if one were to regard the chips as the microelectronic elements, all of the chips overlie the same area of the substrate. Further, one could not regard the chips alone as the microelectronic elements, because the chips alone do not extend over the peripheral portion of any substrate in the reference.

For the reasons set forth above, Wang '321 does not meet the structure of claim 37, and the rejection of claim 37 on this reference should be withdrawn. The rejection of dependent claims 39-45 should be withdrawn for the same reasons.

As it is believed that all of the objections and rejections set forth in the Official Action have been fully met by the foregoing amendments and remarks, favorable reconsideration and allowance of all claims are earnestly solicited.

If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that he telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which he might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Dated: July 31, 2006

Respectfully submitted,

By 

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